Supplemental Work Plan

North Boeing Field
Fire Training Center Project
King County Airport
Seattle, Washington

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Prepared for

Boeing Corporate Environmental Affairs
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1.0 INTRODUCTION

This document presents a supplement to the Work Plan (Landau Associates 1992) which describes a remedial action program planned at the North Boeing Field Fire Training Center, King County Airport, Seattle, Washington. The remediation will be conducted as an independent action under the Model Toxics Control Act (MTCA) Cleanup Regulation (WAC 173-340). It is anticipated that remedial activities will be performed during the dryer summer months in 1993.

Key elements of the program will include excavation of up to an estimated 4,000 yd^3 of soil containing petroleum hydrocarbons from two separate areas, removal of a 500-gallon underground storage tank, follow-up soil sampling to assess and document cleanup actions, management of decontamination water and surface water/groundwater during the remediation period, site restoration, and soil treatment.

This supplement provides additional information on soil treatment, confirmation sampling, and site restoration beyond that presented in the 1992 Work Plan. Specifically, this document describes the use of a portable thermal desorption unit to separate hydrocarbons from the soil and destroy them by thermal oxidation. Activities described include treatment plant mobilization, soil processing, and confirmation sampling. Excavation backfilling with treated soil and final grading and hydroseeding are also discussed. The proposed site layout is shown on Figure 1.

2.0 WORK PLAN TASKS

2.1 TREATMENT PLANT MOBILIZATION

The thermal desorption unit is modular, portable, and largely self-contained. Figure 2 presents a process flow diagram for the unit. The unit will be assembled and operated in a designated treatment/stockpile area located near the excavation zone. The treatment area will include all equipment necessary to operate and maintain the treatment plant, including propane storage for fueling the main and secondary burners. Water and primary electrical service will be provided through hookup with existing Boeing or airport utility service, or with temporary facilities. Mobilization will include a portable "Baker tank" for temporary storage of water resulting from decontamination activities and possible excavation dewatering.

The remediation contractor will be permitted by the Puget Sound Air Pollution Control Authority (PSAPCA) to operate a portable thermal treatment plant. PSAPCA will be provided with advance notification, as required, regarding mobilization of the plant to the site. If required, an air emission compliance (stack) test will be performed once the plant has been assembled.

Propane storage will consist of a trailer-mounted propane tank, which will be periodically refueled onsite. The contractor will ensure that necessary permits are obtained from the Seattle Fire Department or other agencies, as required.

2.2 SOIL PROCESSING

The soil excavated for treatment will consist of fill and native soil. The excavated soil may have to be mechanically screened prior to entering the thermal desorption unit. If screening is necessary, the soil will be loaded into a feed hopper, which discharges to a vibrating screen which separates all particles larger than 2 inches in diameter. Oversized particles will be removed from the screen and temporarily stockpiled. Inorganic oversized material will be combined with the treated soil and placed back into the excavation, after analyses to verify compliance with MTCA standards. If organic oversized material is encountered it will be chipped with a mobil chipper and processed in the thermal desorption unit, or disposed of offsite at an approved location.

Screened soil will be fed into the rotary burner by a variable speed feeder belt. The soil temperature will be raised to about 600-800°F in the rotary burner, which is a counterflow rotating drum heated with liquified petroleum gas (LPG) (propane). Volatile hydrocarbon compounds and moisture in the soil are evaporated as the soil moves through the burner drum.

The evaporated hydrocarbon compounds and moisture are exhausted from the rotary burner along with particulates. Larger soil particles and dust are removed from the exhaust stream by a knockout box and baghouse filters, respectively. The cleaned exhaust gases are then routed to a propane-fueled, thermal oxidizer/stack vent (secondary burner) which heats the gases to approximately 1,450°F providing greater than 99 percent combustion of the evaporated hydrocarbon compounds.

Treated soil is discharged from the rotary burner to a temporary surge pile by an enclosed auger. Soil particles and dust collected by the knockout box and baghouse filters are discharged to the auger. The auger is equipped with water spray nozzles for adding moisture to the treated soil thereby controlling fugitive dust emissions.

Soil entering the rotary burner will be weighed by a scale built into the feeder belt. The processed tonnage and volume will be determined based on the accumulated weight recorded by the scale.

Soil entering the treatment plant will have concentrations of total petroleum hydrocarbons (TPH) which exceed MTCA cleanup criteria for soil. The target treatment level for these constituents will be 100 mg/kg.

Treated soil will be removed from the discharge surge pile and stockpiled pending replacement in the excavation. The treated soil will be temporarily stockpiled separately based on daily production for protection in the event that the treated soil does not meet required cleanup criteria.

If untreated soil is temporarily stockpiled, the stockpile area will be appropriately bermed and lined to prevent water from draining to the underlying soil. Water draining from the untreated soil will be routed to a collection point and pumped to a temporary holding tank (see Work Plan for a detailed description of water management activities).

2.3 CONFIRMATION SAMPLING

Confirmation sampling in the excavation will be completed as described in the 1992 Work Plan. Soil sampling will also be performed to confirm the performance of the thermal desorption treatment unit. Grab samples will be obtained from treated soil discharging from the auger for about every 50 tons of discharged treated soil. Grab samples will be composited daily in the field for laboratory chemical testing.

Composited soil samples will be sent to a local laboratory certified by the Washington State Department of Ecology (Ecology) to perform the necessary tests. The samples will be tested for total petroleum hydrocarbons (TPH) (Ecology method WTPH-D). The laboratory will provide either 24-hour or 48-hour turnaround for all submitted soil samples. Chemical test results will be transmitted to the Boeing Project Manager.

Soil sampling and handling, and chemical testing, will be conducted in accordance with Ecology guidelines and the procedures described in the 1992 Work Plan. Sufficient sample volumes will be obtained to permit duplicate testing, if required.

3.0 SITE RESTORATION

The excavation will be backfilled with soil which has been successfully treated. Any standing water will be removed from the excavation prior to backfilling. Backfill placed near the base of the excavation will be placed in relatively thick, loose lifts on the order of about 1 ft, and will be compacted to a minimum of 88 percent of maximum dry density. Fill placed within 2 ft of the surface subgrade elevation will be placed in maximum 8-inch thick loose lifts and compacted to a minimum of 92 percent of maximum dry density. The maximum dry density will be determined according to the ASTM D 1557 test procedure.

Because of the heterogeneous nature of the site soil, it may be sensitive to moisture changes. Therefore, the soil will be conditioned, placed, and compacted near the optimum moisture content, as determined according to the ASTM D 1557 test procedure. Moisture conditioning will be accomplished either wholly or in part by addition of water in the discharge auger. The contractor may adopt additional methods, if required.

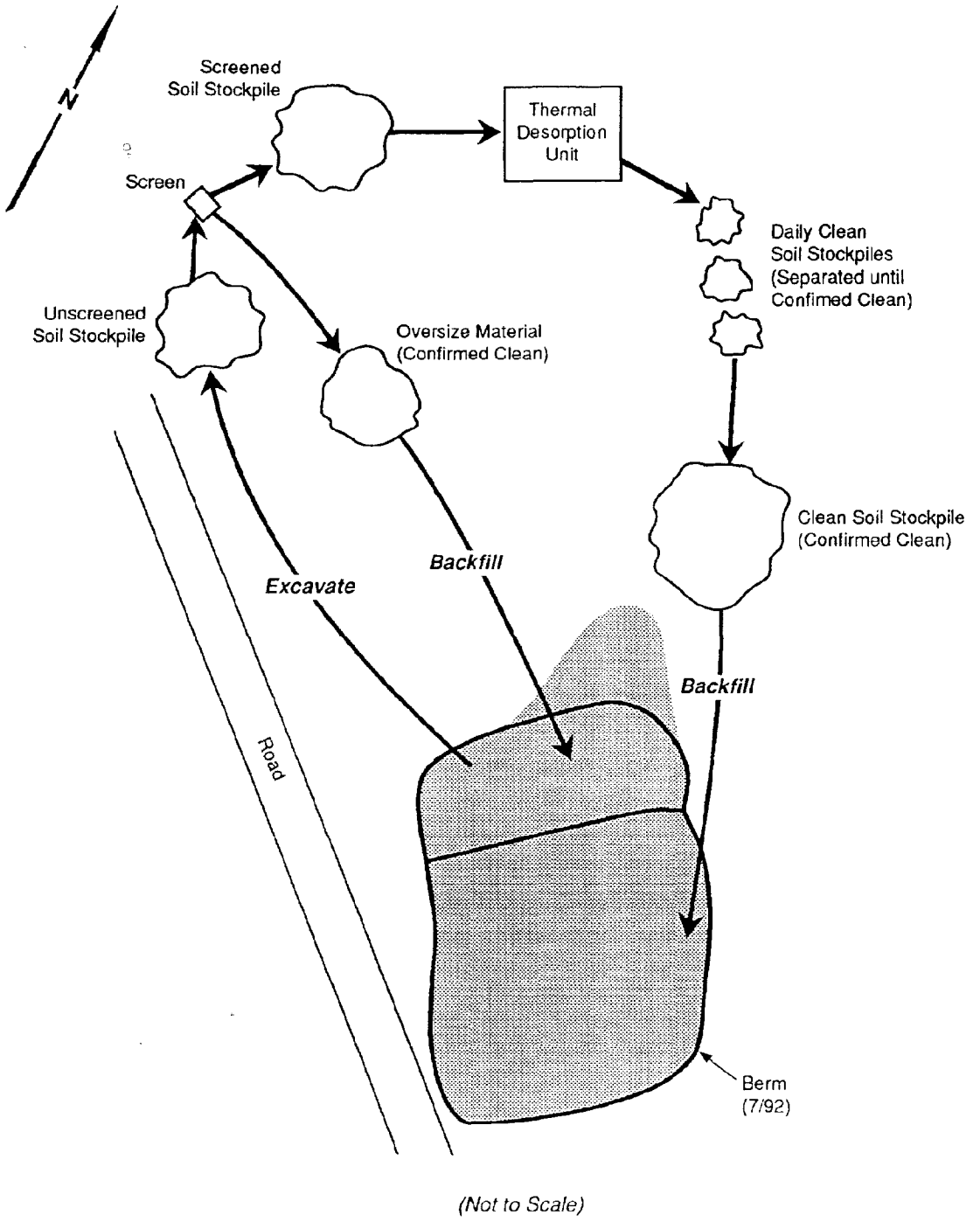
Backfilling will be accomplished during periods of dry weather to avoid problems associated with over optimum moisture conditions such as subgrade softening and soil pumping during compaction. The contractor will protect stockpiled backfill and exposed subgrade soil or in-place, compacted backfill from wet weather by appropriate means. Topsoil will be placed in a loose lift at least 2 inches deep. The finished ground surface will be graded to promote drainage and to be compatible with the surrounding ground surface. The site will be hydroseeded with a grass seed mixture consistent with the surrounding vegetation, as recommended by the hydroseeding contractor.

4.0 SCHEDULE

The estimated project schedule is provided on Figure 3. The key variable in this schedule is the time needed for the thermal desorption unit to treat the excavated soil. The thermal treatment plant is expected to treat soil at a rate of 20 to 30 tons per hour. If these rates are sustained, treatment is expected to require approximately 30 working days to complete the project. Actual treatment rate(s) will depend on target treatment levels and permitted emission limits for volatile organic compounds, opacity, and particulates.

5.0 REFERENCES

Landau Associates, Inc. 1992. *Work Plan, Cleanup Action Program, North Boeing Field Fire Training Center, King County Airport, Seattle, Washington.* December.



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	Proposed Site Layout	Figure 1

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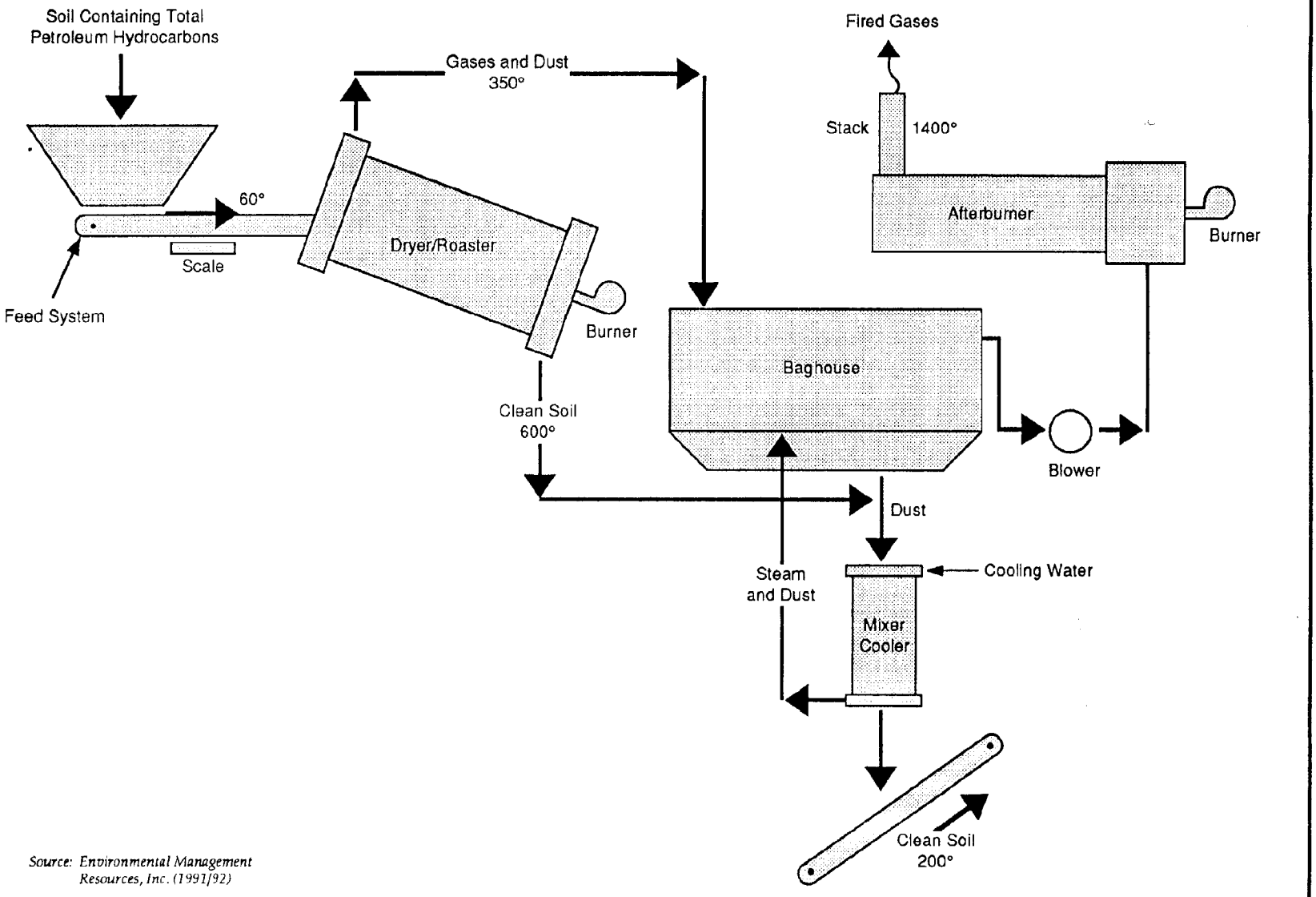
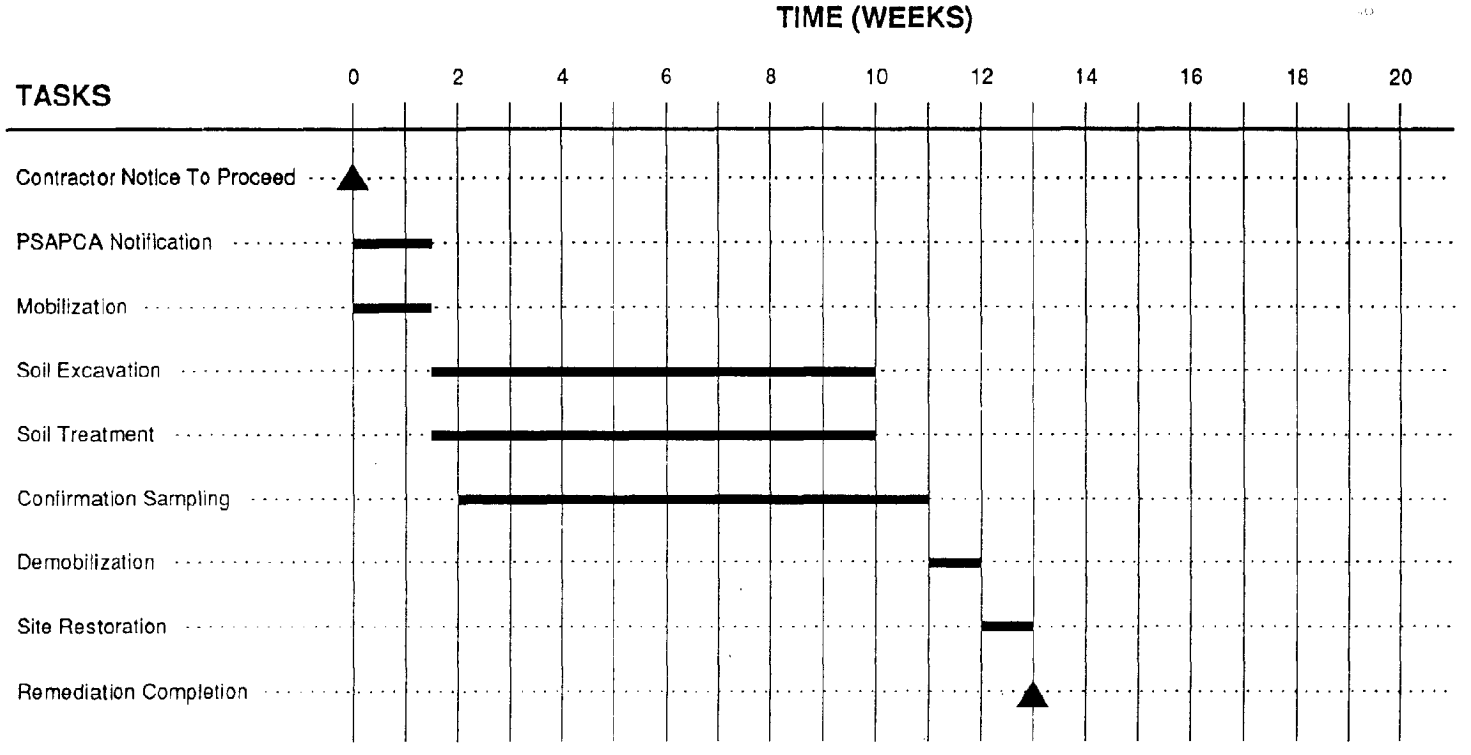


Source: Environmental Management Resources, Inc. (1991/92)

Thermal Desorption Plant Process Flow Diagram

Figure 2



Cleanup Action Program Schedule

Figure 3